

MIKE SOLTYS, PH.D

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I'm a leader in bringing engineering education research to practice, creating curriculum that uses engaging experiential education techniques, and passionate about creating equitable pathways and opportunities so that all students can succeed in engineering.

EDUCATION

DEC 2013	University of Colorado, Boulder Ph.D. in Civil Engineering, Fluid Dynamics Thesis: "Experimental Investigations on the Role of Structure in Turbulent Mixing of Initially Isolated Scalars" Advisor: Prof. John Crimaldi Dissertation Excellence Award	GPA: 3.91
DEC 2006	Clemson University Bachelors in Civil Engineering Emphasis: Applied Fluid Mechanics	GPA: 3.95 <i>summa cum laude</i>

POSITIONS

<i>Current</i> AUG 2023	Associate Director and Principal Instructor <i>Integrated Design Engineering Program</i> at CU Boulder Designed and taught hands-on, active learning curriculum in classes ranging from 9 to 108 students. Taught courses, including First-Year Engineering Projects, Engineering Design for the Community, Statics, Thermodynamics, and Engineering Explorations Through Physics. Acknowledged as a top teaching performer in the College of Engineering. Created engineering YouTube channel with over 250,000 views and almost 1,000 subscribers.	
Aug 2020 Aug 2014	Senior Instructor at University of Colorado, Boulder Instructor at University of Colorado, Boulder <i>Integrated Design Engineering (formerly Engineering Plus)</i>	 FCQ summary YouTube Channel
Jun 2024 FEB 2024	Visiting Erskine Fellow in Industrial Product Design <i>University of Canterbury, Christchurch New Zealand</i> Redeveloped a thermofluids course taught to product designers to incorporate Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) elements.	
Feb 2024 JAN 2022	Principal Investigator and Project Lead TeachEngineering.org	<i>University of Colorado</i>
Dec 2021	Co-Principal Investigator / Project Lead	 NSF #1941701 \$3,819,365

JUNE 2014	<i>TeachEngineering.org</i>	NSF #144495 \$1,001,000
JUL 2014	Professional Research Assistant	
JAN 2014	<i>TeachEngineering Digital Library</i>	<i>University of Colorado</i>
	Developed curriculum and aligned existing curriculum to Common Core State Standards (CCSS). Augmented existing curriculum when possible to meet learning objectives in CCSS.	
DEC 2013	NSF Graduate Teaching Fellow	
JUN 2011	<i>University of Colorado, Boulder</i>	
	Developed and taught hands-on engineering curricula for 9-12 grade students. Performed engineering and science outreach activities targeting under-represented groups.	
DEC 2013	Research Graduate Student and Lab Manager	
AUG 2007	<i>Environmental Fluid Mechanics Laboratory</i>	<i>University of Colorado</i>
	Designed a new experimental technique for studying interactions between multiple scalars in turbulent aqueous flows using laser-induced fluorescence. Manufactured experimental apparatuses including laser optics and machine vision systems. Developed data analysis and image processing algorithms using MATLAB and R.	
DEC 2012	Lecturer at University of Colorado, Boulder	
AUG 2012	<i>Civil Engineering</i>	
	Taught hydraulic engineering for a class of 96 students focusing on design applications of fluid dynamics related to water resources engineering.	
SEPT 2006	Undergraduate Research Assistant	
MAY 2006	<i>Clemson University Wind Load Test Facility</i>	<i>Clemson University</i>
	Constructed scale models and used them to gather structural loading data in a wind tunnel. Visualized flow using smoke machines. Acquired structural loading data through destructive testing in the field.	
AUG 2005	Engineer Diver Co-Op	
JAN 2004	<i>Collins Engineers, Inc.</i>	<i>Charleston, SC</i>
	Performed more than 125 underwater inspections using SCUBA diving techniques. Wrote structural inspection reports, including AutoCAD drawings.	

HONORS & AWARDS

- 2022 [Charles A. Hutchinson Memorial Teaching Award](#) (Highest teaching honor at CU Engineering)
- 2018 College of Engineering and Applied Science Top 20 Teaching Performers
- 2017 College of Engineering and Applied Science Top 20 Teaching Performers
- 2015 Winner: QuickLeft Where Are Your Wearables Hackathon
- 2014 Top 1% of data analysts on data science site, kaggle.com
- 2013 Department of Civil, Environmental, and Architectural Engineering Dissertation Excellence Award

SERVICE & LEADERSHIP

<i>Current</i> 2023	Associate Director: Integrated Design Engineering Program University of Colorado, Boulder
<i>Current</i> 2018	National Academy of Engineering EngineerGirl Steering Committee Elected as Co-Chair in 2022.
2023 2021	Integrated Teaching and Learning Program Leadership Team University of Colorado, Boulder
<i>May 2023</i> <i>Jan 2023</i>	GEEN 1400: First Year Projects Coordinator University of Colorado, Boulder
<i>May 2023</i> <i>Jan 2023</i>	CEAS IT Governance Committee University of Colorado, Boulder
<i>MAY 2023</i> <i>AUG 2022</i>	Faculty Leadership Institute Fellow <i>University of Colorado, Boulder</i>
<i>June 2022</i> <i>Nov 2021</i>	CEAS Dean Search Committee <i>University of Colorado, Boulder</i>
2022	Integrated Design Engineering Faculty Search Committee
2021 2020	Integrated Design Engineering Faculty Search Committee <i>University of Colorado, Boulder</i>
2020	Remote Labs and Projects Courses Working Group <i>University of Colorado, Boulder</i>
2020 2016	LA Program Department Liaison <i>University of Colorado, Boulder</i>
2019	Financial Futures Statics and Thermo Committee <i>University of Colorado, Boulder</i>
2017	CEAS Curriculum Committee <i>University of Colorado, Boulder</i>
2017 2014	New Faculty Orientation Participated in instructor portion of new faculty orientation for CEAS.
2016	PHYS 1140 Transformation Committee

COURSES WITH SIGNIFICANT DEVELOPMENT

- **GEEN 1010: Engineering Explorations Through Physics** Designed physics course in collaboration with the [CU GoldShirt program](#) to increase retention of underrepresented students. Course consisted of interactive lectures, labs, and recitations.
- **GEEN 2851: Statics for Engineers** Re-imagined a traditional statics course to include weekly projects and desktop learning modules. Also created a final design-build project where students measured material properties with a universal testing machine and used this data to construct a truss to meet a 1,000 pound design load.

COURSES DEVELOPED IN COLLABORATION

- **GEEN 2400: Engineering Design For the Community** Built upon a service-learning course where interdisciplinary teams find a client in the community with a unique need, set design constraints, determine project scope, design, and build a solution to meet the client's need.
- **GEEN 3852: Thermodynamics** Created a thermodynamics course with a final design project wherein students designed and built a device to transform heat into useful work. Used a partial flipped-classroom model to facilitate students' problem-solving in-class.
- **GEEN 3853: Measurements and Data Analysis** Team-taught a projects-based course covering experimental design, data acquisition, and data analysis. Projects included a model to theory project wherein students built a musical instrument, a controls project where students built a smart-home device, and an open-ended final project where students designed and executed their own experiment.

OTHER COURSES TAUGHT

- **GEEN 1400: First-Year Engineering Projects**
- **CVEN 3323: Hydraulic Engineering**
- **MCEN 2023: Statics**

GRANTS & FELLOWSHIPS

AUG 2019	TeachEngineering: Democratizing Engineering Education for PK-12 Teachers J. SULLIVAN (PI), M. SOLTYS (PI), M. ZARSKE (CO-PI) National Science Foundation award #1941701	\$3,819,365
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MAR 2018	TeachEngineering Digital Library YouTube Video Production M. SOLTYS (PI) <i>CU Engineering Excellence Fund</i>	\$3,000
OCT 2017	Raspberry Pi: Low Cost Computing for Engineering Plus Design Courses and ITLL Checkout M. SOLTYS (PI) <i>CU Engineering Excellence Fund</i>	\$2,000
MAR 2016	Additional Laptops for Active Learning in Any Classroom M. SOLTYS (PI) <i>CU Engineering Excellence Fund</i>	\$2,860
SEPT 2015	TeachEngineering: Expanding & Sustaining Curriculum Access for K-12 Teachers J. SULLIVAN (PI), M. SOLTYS (CO-PI), M. ZARSKE (CO-PI) <i>National Science Foundation award #1544495</i>	<i>\$900,556</i>
OCT 2014	Laboratory Equipment, Sensors and Measurement Tools to Enhance Hands-On and Design-Based Courses in the General Engineering Plus Degree Program M. SOLTYS (PI), D. REAMON (PI) <i>CU Engineering Excellence Fund</i>	\$3,000
DEC 2011 AUG 2007	Departmental Graduate Student Fellowship M. SOLTYS <i>Civil, Environmental, and Architectural Engineering</i>	

PEER-REVIEWED PUBLICATIONS

[GOOGLE SCHOLAR](#)

- [1] M. Zarske and **M. Soltys**. Engagement in Practice: Practicing Empathy in Engineering for the Community Course. In *ASEE Annual Conference and Exposition, Montreal, 2020*.
- [2] S. Hug and **M. Soltys**. Engineering Outreach: Ambassador Girls Empowering Girls in the Field. In *ASEE Annual Conference and Exposition, Montreal, 2020*.
- [3] R. Reitsma, J. Sullivan, and **M. Soltys**. TK-12 Engineering and the Next Generation Science Standards: A Network Visualization and Analysis. In *ASEE Annual Conference and Exposition, Montreal, 2020*.
- [4] **Soltys, M. A.** and J. P. Crimaldi. Joint probabilities and mixing of isolated scalars emitted from parallel jets. *J. Fluid Mech*, 769:130–153, 2015.
- [5] C. Samson, J. Sullivan, **M. Soltys**, and R. Reitsma. The Relevance of K-12 Engineering Curricula to NGSS: An Analysis of TeachEngineeringNGSS Alignments. In *ASEE Annual Conference and Exposition, Seattle, Washington, 2015*.

- [6] **Soltys, M. A.** and J. P. Crimaldi. Special Issue Cover Image: The role of structured stirring and mixing on gamete dispersal and aggregation in broadcast spawning. *Journal of Experimental Biology*, 215(6):Cover, 2012.
- [7] **Soltys, M. A.** and J. P. Crimaldi. Scalar interactions between parallel jets measured using a two-channel PLIF technique. *Experiments in Fluids*, 50(6):1625–1632, 2011.

PRESENTATIONS & WORKSHOPS

- [1] **Mike A. Soltys**, Dua Chalker, and Jackie Sullivan. Transforming the role of engineering in science education: A demonstration, conversation and action plan. In *NSF EEC Washington, DC*, 2019.
- [2] **Mike A. Soltys** and Mindy Zarske. Using teachengineering to bring design thinking and ngss engineering standards into your classroom. In *ASEE PCEE Tampa*, 2019.
- [3] **Mike A. Soltys** and Janet Tsai. Incorporating active learning into first-year engineering project courses. In *ACTIVE Faculty Development and Leadership Intensive*, 2018.
- [4] Farrokh Shoaie, **Mike A. Soltys**, Aaron True, and John Crimaldi. The Effect Of Obstacle Wakes On Reaction Enhancement Between Two Initially Distant Scalars. In *APS Division of Fluid Dynamics Gallery of Fluid Motion*, 2014.
- [5] **Mike A. Soltys** and John P. Crimaldi. Turbulent generation of scalar covariance between two initially distant scalars: Implications for enhanced mixing and reaction. Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, November 25, 2013.
- [6] **Mike A. Soltys**. The effect of structured stirring and mixing on scalar covariance of initially distant scalars. Dynamical and Chaotic Systems Seminar, Boulder, CO, September 5, 2013.
- [7] **Mike A. Soltys**. Interactions between isolated scalars in turbulent flows. Boulder Fluid Dynamics Seminar, Boulder, CO, June 25, 2013.
- [8] **Mike A. Soltys**. Joint probabilities of two scalars emitted from parallel jets using planar laser induced fluorescence. University of Colorado Water Resources Seminar, Boulder, CO, December 12, 2012.
- [9] **Mike A. Soltys** and John P. Crimaldi. Interactions between turbulent mixing and coral reproduction. TOS/ASLO/AGU 2012 Ocean Sciences Meeting. Salt Lake City, UT, February, 2012.
- [10] **Mike A. Soltys**. Turbulence, lasers, and coral sex: What turbulence can teach us about broadcast spawning (and visa versa). Fluids Connections. Boulder, CO, October 10th, 2010.
- [11] **Mike A. Soltys**. Laser induced fluorescence. Fluids Connections. Boulder, CO, October 27, 2009.

- [12] John P. Crimaldi and **Mike A. Soltys**. A two-color planar laser induced fluorescence technique for two-scalar mixing and reaction experiments. Turbulence, Heat and Mass Transfer 6, Rome, IT, September 14, 2009.
- [13] **Mike A. Soltys**. Environmental fluid mechanics. University of Colorado Water Resources Seminar, Boulder, CO, November 12, 2008.

OUTREACH ACTIVITIES

- Apr 2019 **Admitted Student Day** Manned booth advertising engineering plus to admitted students.
- Jul 2018 **BOLD CAMPOS Camp** Taught week-long design project for 50 rising 12th grade students.
- Jul 2017 **Goldshirt Physics/Math Summer Bridge** Designed and taught two-week physics and math component of Goldshirt Summer Bridge program.
- Jul 2017 **BOLD CAMPOS Camp** Taught week-long design project for 50 rising 12th grade students.
- Nov 2016 **Girls Explore Engineering Day** Presented Flash-talk to Girls interested in Engineering.
- Jul 2016 **BOLD CAMPOS camp** Taught week-long design project for 50 rising 12th grade students.
- Jul 2016 **I Have A Dream Design Camp** Organized and lead one-month design camp for 60 rising 9th grade students.
- Apr 2016 **Admitted Students Day Open House** Participated in Admitted Students Day presentation.
- Feb 2016 **Boettcher Finalist Day** Presented recruitment materials to Boettcher Scholarship finalists.
- Aug 2015 **Academic Expectations Session** Served on faculty panel addressing new University of Colorado students and parents.
- Aug 2015 **Sparkfun Microntrollers for Education** Collaborated with Sparkfun Education in hands-on workshop on integrating microcontrollers into K-12 classrooms.
- Jun 2015 **EngiNEAR me** Designed and led one week hands-on design project for 40 high school seniors.
- Apr 2015 **DSST Visit Day** Led a hands-on activity and gave a presentation to recruit students to University of Colorado Engineering.
- Feb 2015 **Boettcher Finalist Day** Presented recruitment materials to Boettcher Finalists.
- Feb 2015 **Gold Shirt Panel** Participated in GoldShirt Faculty Panel answering questions for incoming GoldShirt Students.
- Nov 2014 **Talented Scholars Day** Led a hands-on activity and gave a presentation to recruit students to University of Colorado Engineering.
- May 2014 **Gates Expo Judge** Served as a judge for the Graland's Gates Invention and Innovation Competition.

- Mar 2014 **DSST Visit Day** Led a hands-on activity and gave a presentation to recruit students to University of Colorado engineering.
- Feb 2014 **DSST-Green Valley Ranch/CU-Boulder STEM Visit** Led a hands-on activity and gave a presentation to recruit students to CU engineering.
- July 2013 **Goldshirt and Aspire summer bridge** Helped plan and implement new design project: search and rescue assistants (SARAs) for Goldshirt and Aspire summer bridge.

UNDERGRADUATE STUDENTS MENTORED

TeachEngineering Video Project

- | | |
|-----------------------------------|------------------------------|
| • Alissa Mastronardi (2017-2019) | • Joshua Sun (2019) |
| • Nahum Tariku (2017-2019) | • Patrick Gibbs (2017-2018) |
| • Fernanda Villalobos (2018-2019) | • Annabel Lee (2017-2018) |
| • Colin Soguero (2019) | • Alex Carrasco (2018) |
| • Conner Mcleod (2019) | • Cadence Speelman (2018) |
| • Sarah Macdonald (2019) | • Grant Lewis Stewart (2018) |
| • Erin Ruby (2019) | • Millicent Gabriel (2017) |
| • Amelia Wigton (2019) | • John Roach (2017) |
| • Jack Marty (2019) | |

Independent Studies

- Krish Desai (2017)

You'RE@CU mentoring program

- Allie Banks (2011)

PERSONAL INTERESTS & SKILLS

Physical computing (Arduino, RaspberryPI, C++, ATMEL microcontrollers, circuits)
 Product development and prototyping (Solidworks, OnShape, 3D printing, manufacturing)

Data analysis (R, MATLAB, Python, $\text{\LaTeX}$)

Web development (HTML, Javascript, CSS)

Skiing

Mountain and gravel cycling

Trail running

Youth soccer coach

PROFESSIONAL ORGANIZATIONS

American Society of Engineering Education

American Physical Society

American Society of Civil Engineers

Tau Beta Pi